N. LU & L. Y. ZHENG

Nankai University, Tianjin

IDENTITY OF SOME '*LYGUS*' SPECIES DESCRIBED FROM TAIWAN BY B. POPPIUS (HETEROPTERA: MIRIDAE)

Lu, N. & L. Y. Zheng, 1998. Identity of some '*Lygus*' species described from Taiwan by B. Poppius (Heteroptera: Miridae). – Tijdschrift voor Entomologie 140 [1997]: 185-189, figs. 1-16. [ISSN 0040-7496]. Published 26 March 1998.

Type specimens of seven '*Lygus*' species, described by B. Poppius in 1912-1915 from Taiwan (=Formosa), are studied. The following new combinations are established: *Apolygus eous* (Poppius), *Apolygus fuhoshoensis* (Poppius), *Apolygus kosempoensis* (Poppius), *Lygocoris (Neolygus) bipuncticollis* (Poppius), *Lygocoris (Neolygus) v-nigrum* (Poppius). Lectotypes for *Lygus disciger* Poppius, *Lygus kosempoensis* Poppius, and *Lygus sauteri* Poppius are designated, and some additional descriptive data are provided.

Correspondence: Le-Yi Zheng, Department of Biology, Nankai University, Tianjin 300071, P. R. China. E-mail: liugq@sun.nankai.edu.cn.

Key words. – Poppius; Taiwan; Miridae; '*Lygus*'; lectotype designations; new combinations.

B. Poppius (1912, 1915) described a number of Miridae from the Indo-Pacific region under the all-embracing generic name '*Lygus*' (Carvalho 1959, Schuh 1995). The type specimens of a part of these species, preserved in the Hungarian National Natural History Museum, have been examined and briefly noted by Carvalho (1980). Recently, we examined some type specimens of Poppius' '*Lygus*' species, collected from Taiwan (=Formosa), which are deposited in the 'Deutsche Entomologische Institut, Eberswalde (DEI) and the Zoological Museum of the University of Helsinki (ZMUH). The results are here reported, some descriptive data additional to the original descriptions are given, lectotypes are designated, and new combinations established. Measurements are given in millimetres. The terminology for vesical structures follows Yasunaga (1991).

Apolygus kosempoensis (Poppius, 1915) comb. n.
(figs. 1-5)

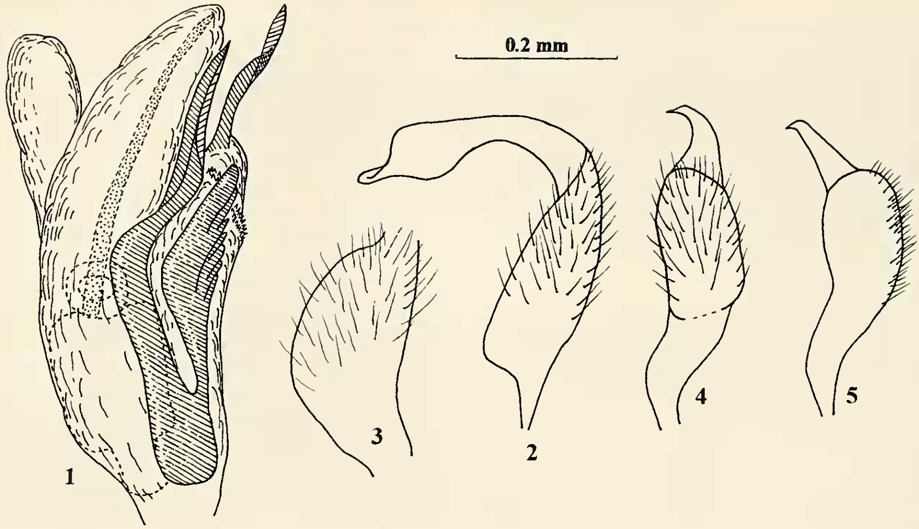
Lygus kosempoensis Poppius, 1915: 26. – Lectotype ♂ (present designation) [glued on card, antennal segments 3 and 4, right middle leg, left fore and left hind legs missing]: 'Kosempo Formosa H. Sauter 1911' (print); '7. VII' (print); 'Lygus kosempoensis n. sp. '(hand-written); 'Mus. Zool. H: fors Spec. typ. No. (print), 10181 Lygus kosempoensis Popp. (hand-written)' [ZMUH]. [examined]

Other material examined. – Paralectotypes 2♂ (present designation): 1♂ [glued on card, all legs missing (except for all coxae)], 'Kosempo Formosa H. Sauter 1911' (print); '7. VII' (print); 'Mus. Zool. H: fors Spec. typ. No. (print), 10182 Lygus kosempoensis Popp. (hand-written)'; 1♂ [glued on card, antennal segment 4, fore legs (except coxae), left middle leg (except coxa) missing], 'Kosempo Formosa H. Sauter 1911' (print); '7. VII' (print); 'Mus. Zool. H: fors Spec. typ. No. (print), 10183 Lygus kosempoensis Popp. (hand-written)' [ZMUH].

Additional description. – Vertex width : head width = 0.30 in male. Cuneus about 1.3 times as long as its basal width. Body length 3.60-3.65, width 1.80-1.85. Head length 0.25-0.28, width 1.02-1.05. Antennal segments lengths 0.41-0.50: 1.30-1.46: 0.69-0.74: 0.55-0.58. Pronotum length 0.78-0.80, width 1.51-1.57. Corium length 1.76-1.87; cuneus length 0.63-0.66; claval commissure length 0.69-0.75.

Male genitalia (lectotype dissected) (figs. 1-5). – Parameres as in figs. 2-5. Vesical spicule absent; ventral sclerite S-shaped; wing-shaped sclerite triangular, outer margin with big spines; lateral sclerite slender, slightly twisted; sublateral sclerite developed, broad; seminal duct swollen greatly, secondary gonopore broad.

Note. – A female specimen [ZMUH], similarly labelled as the type series, but without a 'type' label,



Figs. 1-5. Male genitalia of *Apolygus kosempoensis*. – 1, vesica; 2-3, left paramere; 4-5, right paramere.

was also examined. The following notes refer to this female: Vertex width : head width = 0.42 in female. Body length 3.83, width 1.80. Head length 0.22, width 0.88. Pronotum length 0.96, width 1.68. Corium length 1.84; cuneus length 0.63; claval commissure length 0.83.

Remarks. – On the basis of the body size and form, colour pattern, texture of the body surface and the structure of male genitalia, this species is here placed in the genus *Apolygus* China.

Apolygus eous (Poppius, 1915) comb. n.

Lygus eous Poppius, 1915: 27. – Holotype ♂ [glued on card, left antennal segment 4, right antennal segment 3 and 4, right hind leg (except coxa) missing]: 'Fuhosho Formosa H. Sauter' (printed); '7. IX' (printed), 'Poppius det.' (printed); 'Holotypus' (printed on reddish brown card); 'Lygus eous n. sp.' (hand-written) [DEI].[examined]

Additional description. – Vertex width : head width = 0.30 in male. Cuneus about 1.7 times as long as its basal width in male. Body length 3.71, width 1.75. Head length 0.34, width 0.91. Antennal segments lengths 0.51: 1.32: 0.80: ? (lost). Pronotum length 0.86, width 1.49. Corium length 1.89; cuneus length 0.59; claval commissure length 0.77.

Remarks. – On the basis of the external appearance and the exposed parameres, this species is here recombined with the genus *Apolygus* China.

Apolygus fuhoshoensis (Poppius, 1915) comb. n.

Lygus fuhoshoensis Poppius, 1915: 31.

Material examined. – Holotype ♂ [glued on card, antennae (except left segment 1), right middle and right hind legs (except coxae) missing, left middle tibia broken near apex, apical part missing]: 'Fuhosho Formosa H. Sauter' (print); '7. IX.' (print); 'Poppius det.' (print); 'TYPUS' (print, on pale brown card); 'Lygus fuhoshoensis n. sp.' (hand-written); 'Holotypus' (print on reddish brown card) [DEI].

Additional description. – Vertex width : head width = 0.29 in male. Cuneus about 1.2 times as long as its basal width in male. Body length 3.92, width 1.71. Head length 0.23, width 0.85. Antennae lost. Pronotum length 0.86, width 1.49. Corium length 1.89; cuneus length 0.59; claval commissure length 0.77.

Remarks. – Judging by the general habitus and the exposed parameres, this species is here placed in the genus *Apolygus* China.

Lygocoris (Neolygus) bipuncticollis (Poppius, 1915) comb. n. (fig. 6)

Lygus bipuncticollis Poppius, 1915: 25. Holotype ♂ [glued on card, left antennal segment 3 broken (apical part missing), right antennal segment 4 and right hind leg (except left coxa) missing]: 'Kankau (Koshun) Formosa H. Sauter VII.1912' (print); 'Poppius det.' (print); 'Holotypus' (print on reddish brown card); 'Lygus bipuncticollis n. sp.' (hand-written) [DEI].[examined]

Additional description. – Vertex width : head width = 0.34 in male. Cuneus about 1.6 times as long as its basal width in male. Body length 3.92, width 2.39. Head length 0.36, width 1.09. Antennal segments lengths 0.71: 1.75: 0.85: ? (lost). Pronotum length 0.94, width 1.62. Corium length 1.90; cuneus length 0.63; claval commissure length 0.69.

Remarks. – The exposed right paramere (fig. 6) clearly proved to be of the typical *Neolygus* form; the body form and colour pattern also show that it is a species of the subgenus *Neolygus* Knight, genus *Lygocoris* Reuter.

Lygocoris (Neolygus) v-nigrum (Poppius, 1915) comb. n.

Lygus v-nigrum Poppius, 1915: 31. – Holotype ♂: [glued on card, left antenna, right antennal segments 3 and 4, fore and middle legs (except coxae), left hind tibia and tarsus missing] – 'Taihorinsho Formosa H. Sauter, 1909' (print); '7. IX.' (print); 'Poppius det.' (print); 'typus' (print on pale brown card); 'Lygus fuhoshoensis n. sp.' (hand-written); 'Holotypus' (print on reddish brown card) [DEI] [examined].

Additional description. – Vertex width : head width = 0.31 in male. Cuneus about 1.7 times as long as its basal width in male. Body length 4.14, width 1.76. Head length 0.36, width 0.88. Antennal segments lengths 0.46: 1.42: ?(broken): ? (lost). Pronotum length 0.81, width 1.44. Corium length 1.94; cuneus length 0.72; claval commissure length 0.81.

Remarks. – The body form, colour pattern and the exposed right paramere indicate that it is a member of the subgenus *Neolygus* Knight of the genus *Lygocoris* Reuter.

Lygocoris (Neolygus) disciger (Poppius, 1915)

Lygus disciger Poppius, 1915: 34.

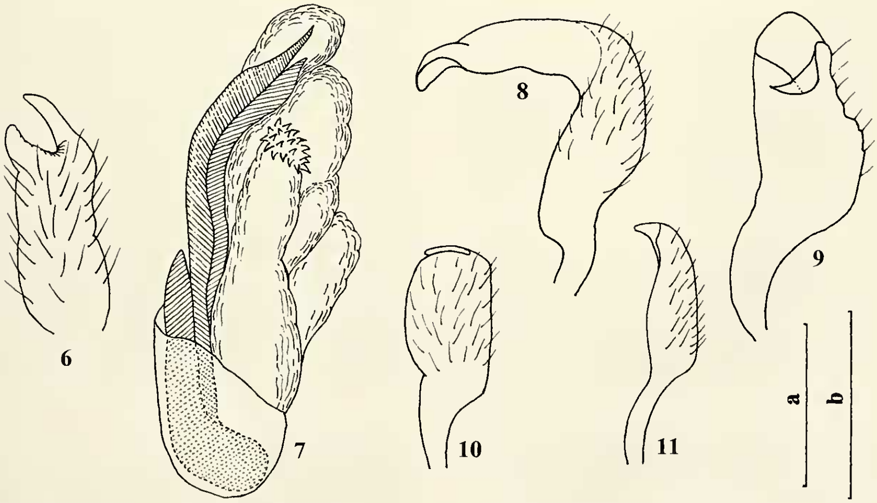
Lygocoris (Neolygus) disciger; Schwartz & Kerzhner, 1997: 252. – Lectotype ♀(present designation): [left corium and left membrane, both antennae missing] – 'Fuhosho Formosa H. Sauter' (print); '7. IX.' (print); 'Lygus desciger n. sp.' (hand-written); 'Mus. Zool. H: fors Spec. type. No (print), 10176 Lygus disciger Popp. (hand-written)' [ZMUH].[examined]

Additional description. – Vertex width : head width = 0.37 in female. Cuneus about 1.6 times as long as its basal width in female.

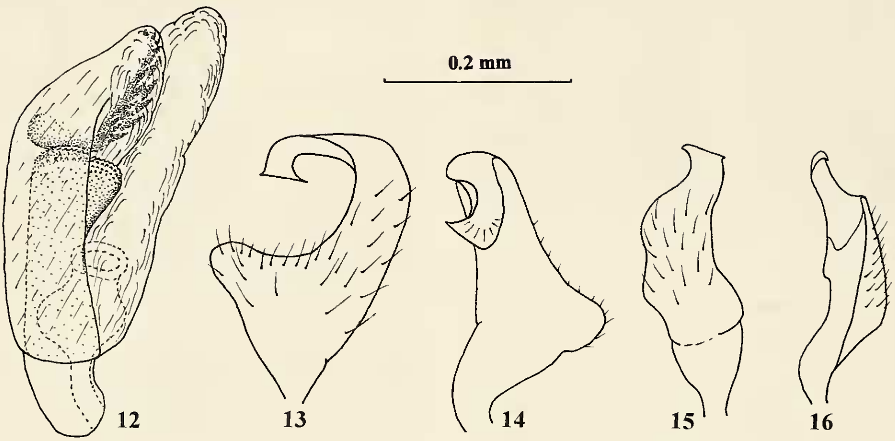
Appendix. – The following descriptive notes are based on specimens collected from China: Guangdong Province (1♂) and Yunnan Province (2♂, 2♀), which we identified as *Lygocoris (Neolygus) disciger* after comparing with the lectotype.

Descriptive notes. – Vertex width : head width = 0.30 in male.

Male genitalia (figs. 7-11). – Parameres as in figs. 8-11. Vesical spicule slender, bending near apex; with a sclerite structure at centre; with 4 membranous lobes; seminal duct cylindric, secondary gonopore relative small. Body length 3.78-4.00, width 1.49-1.62. Head length 0.25-0.28, width 0.88-0.93. Antennal segments lengths 0.55-0.58: 1.52-1.66: 0.76-0.92:



Figs. 6-11. Male genitalia of *Lygocoris (Neolygus)* spp. – 6, Right paramere of *L. bipuncticollis*; 7-11, *L. disciger*. – 7, vesica; 8-9, left paramere; 10-11, right paramere. Scale a: 0.2 mm to fig. 6; b: 0.2 mm to 7-11.



Figs. 12-16. Male genitalia of *Sabactus sauteri*. – 12, vesica; 13-14, left paramere; 15-16, right paramere.

0.50-0.54. Pronotum length 0.63-0.68, width 1.32-1.40. Corium length 1.76-2.05; cuneus length 0.55-0.58; claval commissure length 0.81-0.90.

Remarks. – Schwartz & Kerzhner (1997) place this species in the subgenus *Neolygus* based on the female genitalia, complete basal carina of vertex and tibial spine color; the structure of the vesica, described in this study, also suggests a *Neolygus*-form.

Sabactus sauteri **(Poppius, 1912) comb. n.**

(figs. 12-16)

Lygus sauteri Poppius, 1912: 303.
Sabactus sauteri; Schwartz & Kerzhner, 1997:256, figs. 35-38. – Lectotype ♀ (present designation) [left antenna, right antennal segment 4 missing]: 'Chip Chip Formosa Sauter II 07-09' (print); 'Lygus sauteri n. sp. B. Poppius det.' (print); 'Mus. Zool. H: fors Spec. typ. No (print), 9932 (hand-written) Lygus sauteri Popp. (print) [ZMUH]. [examined]

Other material examined. – Two other specimens belonging to the type-series, labelled with 'Lygus sauteri' (Mus. Zool. H: fors Spec. typ. No 10191: male; Mus. Zool. H: fors Spec. typ. No 10190: female) which were borrowed along with the lectotype (Mus. Zool. H: fors Spec. typ. No 9932) obviously belong to the subfamily Deraeocorinae (*Deraeocoris* sp.?) and are thus misidentified paralectotypes.

Additional description. – Vertex width : head width = 0.38 in female. Cuneus about 1.6 times as long as its basal width.

Appendix. – The following descriptive notes are base upon examinations of specimens collected from China: Sichuan Province (1♀), Guangxi Province (1♂, 2♀), Hainan Province (1♀), Yunnan Province (1♂, 2♀) and Taiwan Province (46♂, 54♀ [Bishop Museum]) which we identified as *Sabactus sauteri*, after comparing with the lectotype.

Descriptive notes. – Vertex width : head width = 0.30 in male. Body length 3.92-4.52, width 1.85-2.12. Head length 0.23-0.34, width 0.85-0.88. Antennal segments lengths 0.44-0.48: 1.33-1.41: 0.71-0.87: 0.62-0.69. Pronotum length 0.88-0.99, width 1.53-1.70. Corium length 1.70-1.87; cuneus length 0.58-0.78; claval commissure length 0.61-0.78.

Male genitalia. – Basal part of sensory lobe of left paramere strongly protruded; apex of hypophysis truncate. Hypophysis of right paramere short and broad, apex truncate. Vesical spicule absent; with 4 membranous lobes, the lateral margin of the largest one with several large sclerotized spines, others minutely spinulose on surface; seminal duct short, swollen at middle, secondary gonopore broad.

Remarks. – We follow here the generic placement suggested by Schwartz & Kerzhner (1997). However, the posterior wall of bursa copulatrix of this species lacks the characteristic bifid inter-ramal lobes found in the type species *Sabactus institutus* Distant (Kelton 1955).

Acknowledgements

We are grateful to Dr. R. Gaedicke of the Deutsches Entomologisches Institut, Eberswalde, Dr. L. Huldén of Zoological Museum, University of Helsinki, and Mr. K. Arakaki of Bishop Museum, Honolulu for the kind loan of valuable specimens. We also are very thankful to the Foundation of the Educational Committee of China for its grants for this project.

REFERENCES

Carvalho, J., 1959. A catalog of the Miridae of the world. Part IV. – Arqivos do Museo nacional, Rio de Janeiro 48: 1-384.

Carvalho, J., 1980. Analecta Miridologica, IV: observations on type specimens in the National Museum of Natural History, Budapest, Hungary (Hemiptera, Miridae). – Revista Brasileira de Biologia 40: 649-658.

Kelton, L. A., 1955. Genera and subgenera of the *Lygus* complex (Hemiptera: Miridae). – Canadian Entomologist 87: 277-301.

Poppius, B., 1912. H. Sauter's Formosa-Ausbeute: Miridae (Hem.). – Entomologische Mitteilungen 1: 302-394.

Poppius, B., 1915. H. Sauter's Formosa-Ausbeute: Nabidae, Anthocoridae, Termatophylidae, Miridae, Isometopidae und Ceratocombidae (Hemiptera). – Archiv für Naturgeschichte 80A (8): 1-80.

Schuh, R., 1995. Plant bugs of the world (Insecta: Heteroptera: Miridae) - systematic catalog, distributions, host list, and bibliography. – The New York Entomological Society, New York, 1329 pp.

Schwartz, M. D. & I. M. Kerzhner, 1997. Type specimens and identity of some Chinese species of the '*Lygus* complex' (Heteroptera: Miridae). – Zoosystematica Rossica 5(2): 249-256.

Yasunaga, T., 1991. A revision of the plant bug, genus *Lygocoris* Reuter from Japan, Part I (Heteroptera, Miridae, *Lygus*-complex). – Japanese Journal of Entomology 59: 435-448.

Received: 6 May 1996
Accepted: 20 August 1997